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17. ABSTRACT (MAX. 250 WORDS) A four-period block program consisted of English, algebra, and world geography. The program included large group lectures, small group discussions, independent study, and a supervised study hall. Pupil performance in English in this schema and pupil performance in English in a regular-sized class were compared. Teacher reaction and student reaction to this type of instruction were also compared.

An experimental group of 38 students from the block program was matched with 38 pupils from regular classes. Criteria included sex, age, eighth grade verbal scores, and English test scores. An average increase of 3.00 in the control group and of 3.45 in the experimental group indicated that the experimental group did one-sixth better. However, statistical analysis, t ratio, showed that the difference was not significant.

Teachers found many advantages; students received more individual attention, facilities and equipment received maximum use, and time for parent consultation and student diagnosis increased. Students in the block program felt challenged to work harder, made greater progress in learning procedures, and liked the small discussion groups. Some suggested improvements were to conduct a parent and faculty precourse orientation program and to learn more about team teaching.

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An Experiment in Flexible

WILLIAM GEORGIADES
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Among the several team teaching and flexible scheduling programs in operation in the Centinela Valley Union High School District, one of the most promising is the four-period block at Hawthorne High School. During the 1962-63 school term, 90 ninth-grade pupils were scheduled to participate in this all-morning program, which was comprised of three academic subjects (algebra, English and world geography) and a supervised study hall. (See Table I.) Three teachers and a part-time aide worked together in one large lecture room equipped with projector, screen and sound amplifier. At least two mornings a week three regular-sized classrooms were available for small discussion groups (10-15 pupils). Since this departure from traditional curriculum design is comparatively new, the current effort to analyze and evaluate its effectiveness must be considered somewhat grass roots in nature. The findings which are presented below are sufficiently positive to warrant further experimentation and evaluation.

PROCEDURE

Centinela Valley has attempted to (1) compare pupil performance in English in this schema to pupil performance in English in a regular-sized class, (2) determine teacher reaction to this type of instruction, and (3) determine student reaction.

Comparative test scores were obtained for this group and for pupils enrolled in three regular ninth grade English classes also at Hawthorne High School. From the ninety pupils enrolled in the four-period block (hereafter called experimental group), 38 were matched with 38 pupils from the regular-sized classes (hereafter called control group). Four criteria were used for matching purposes in this study: (1) sex (2) age (3) CTMM verbal score (4) Educational Testing Service Cooperative English Test 2A (1060) (total converted score). The CTMM verbal scores were eighth grade scores from the various elementary schools which these pupils attended (See limitations of this evaluation). The Cooperative English Test 2A was administered to all ninth graders at Hawthorne High School in September 1962.

For evaluation purposes form 2B of the Cooperative English Test was administered to these same pupils in May 1963. Again a converted score was computed for each pupil on total English.

RESULTS

Pupils drawn from the three control classes averaged an increase of 3.00 points ($\sigma = 3.38$) from test 2A to 2B. Pupils drawn from the experimental group averaged an increase of 3.45 points ($\sigma = 3.51$) from test 2A to test 2B. (See Table II.)[1]

A face-value analysis of this data would indicate that the control group averaged exactly one year's growth in English, while the experimental group did one-sixth better. However, a statistical analysis ("t" ratio) shows that the difference in performance of these two groups of matched pairs was not significant at the .05 level of confidence. The "t" ratio was 1.8.[2] Therefore, the null hypothesis that this

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Scheduling in Team Teaching

difference might have been attributable to the sampling procedure, experimental design, etc., could not be rejected.

TEACHER EVALUATION

(See Table III.) For the most part the answers given to the two questions by the three participating teachers speak for themselves. Their enthusiasm can be readily seen. The objections which they have raised are all of an administrative nature and are the type which would be expected in any new system. One further disadvantage with this schema is the difficulty which is present in making class changes for pupils enrolled in the program.

STUDENT EVALUATION

(See Table IV.) The positive responses by pupils to the anonymous questionnaires also indicated more than a mere general acceptance of this learning situation. Note especially answers to questions 5, 7, 13, 21 and 24:

(5, 21 and 24)—Though these are subjective evaluations, the fact that the pupils felt they were challenged to work harder and made greater progress in learning to think for themselves and work independently is a step forward in improving our educational system, for in the final analysis it is the attitude of the pupils which will strongly influence the effectiveness of any program.

(7)—It has been expected that there might be a negative finding on this question. Therefore, the current investigators were especially interested to learn that the pupils experienced little difficulty with the actual lecture room and facilities.

(13)—The pupil enthusiasm for the small group instruction (86%—more) is a key factor. With classes becoming increasingly larger and overcrowded, the pupil in a regular-sized class frequently finds himself among as many as 35 or 40 other pupils. Therefore, it is a novel opportunity to participate in small discussion groups of 10 or 15, which on the whole are possible only when there are large team classes from which they can be developed.

LIMITATIONS OF EVALUATIONS

1. Size of sample—The small sample available severely restricts the applicability of these results.
2. Matched pairs—The necessity of using matched pairs for comparison purposes because of the difference between the control and experimental groups.[3]
3. Teacher variable—The teacher who participated in the four-period block was not in charge of any of the control groups. Actually three different teachers were involved in the control classes, thereby lessening the chance of invalidating the study by making it a comparison of two teachers.[4]
4. CTMM verbal scores—The verbal CTMM scores used in this evaluation were eighth grade scores of tests administered at the various schools from which these pupils came. Therefore, the question arises as to the reliability of the scores, since it could not be stipulated that the test was administered under the same conditions in all cases.
5. Hawthorne effect—The novelty aspect of this design has probably increased the positive results.

DISCUSSION

The fact that the null hypothesis cannot be rejected in this particular analysis in

no way detracts from the significance of the results. The current investigators were not necessarily looking for greatly improved pupil performance under this curriculum design, since it is felt that the design itself has certain inherent merits for both pupil and teacher, making it a highly effective and promising method of teaching. Among its most salient features are:

1. *Flexibility*—This schema has infinite variations both as to subjects which can be taught and time which can be made available for each subject. This flexibility allows the teacher to devote more time in certain areas on days when there is a specific need, because the pupils do not leave the room at the end of the 50-minute period.
2. *Freeing of Teacher Time*—This plan releases the teacher from approximately one-fifth of the in-class time, thereby allowing more opportunity for consultation and preparation.
3. *Lessoning of Monotony*—Rather than making three presentations to 30 pupils each, the teacher lectures to 90 pupils at one time, thereby eliminating much of the monotony of certain teaching situations.
4. *Professional Growth*—An opportunity is offered for both experienced and inexperienced teachers to grow professionally through daily contact with colleagues and consequent exchange of ideas and techniques.
5. *Supervised Study Time*—For the pupil, in addition to the benefits to him through over-all better teaching, there is the advantage of supervised study time with the opportunity for guidance from teachers with whom he is familiar.
6. *Small Groups*—From both the pupil and teacher questionnaires, it can readily be seen that the small group presentations offer many benefits for both pupil and teacher.

Bearing in mind the limitations expressed above, the absence of a significant negative evaluation leads the current investigators to believe that this design is at least initially workable. Subsequent investigation may provide answers to many important questions, such as, the effectiveness of this program for pupils of various degrees of ability. Before any more definite and far-reaching conclusions can be made, further study in this area, exercising greater control of the significant variables, is in order. An evaluation of the 1963-64 program is under way, and it is hoped that the evidence will be more conclusive.

TABLE III

Recapitulation of Teacher Questionnaire—Four-Period Block

A. What advantages do you feel are the outcome of your teaching team?
   1. Students receive more individual attention.
   2. More time devoted to counseling and guidance by the individual teacher or all three teachers together.
   3. Better equalization and coordination of homework load and testing days.
   4. Better opportunity for discussion in small groups.
   5. Greater emphasis placed on methods of learning:
      a. Self-study.
      b. Teacher explanation.
      c. Interaction of student and teacher.

6. Maximum utilization of facilities and equipment.
7. More supervised study time.
8. Greater opportunity for combining different subject classes.
9. Better follow-up procedures.
10. Greater efficiency of time.
11. Benefit to students from combined utilization of teacher's experience and knowledge.
12. More teacher time for evaluation, planning, organization, and preparation to improve teaching skills and methods.
13. Students must be more responsible and self disciplined.
14. More time available for lecturers and activities.
15. Students witness large class competition.
16. Less chance of tests being compromised.
17. More frequent use of library facilities.
18. Less general monotony caused by routine schedule and inflexible regimentation.
19. More variety offered in diversified class schedules.
20. Students receive benefit of contact with librarian and teacher aide.
21. Students receive greater amount of writing and discussion experience.
22. More time for parent consultation and student diagnosis.
23. Better academic grouping for small groups is accomplished.
24. Joint planning provides an opportunity and impetus for improving teaching methods and presentation.
25. Students accept academic difficulties with greater perseverance because reluctant learners are easier to reach.
26. Counselors and teachers are able to work more closely together.
27 More frequent association and coordination among team teachers.
28. Significant problems attacked with team effort.
29. Higher motivation stressed for student investigation and creativity.
30. Students are stimulated by large group pressure and small group association.

B. What disadvantages have been clear to you in your work in team teaching, and what general recommendations would you make concerning the school's use of team teaching?

1. There is a lack of physical facilities for large groups (other than the room used by our team).
2. Senior students should be assigned for assistance.
3. Team teachers need more creative and imaginative approaches along with a reorganization of methods and materials.
4. There is a need for parent and faculty orientation of team teaching in order to overcome the aversion to change.
5. Communication and information of team activities is lacking. (We need information about other teams and techniques.)
6. Teams should have an elected or appointed team spokesman or chairman.

TABLE I
FRESHMEN ENGLISH, ALGEBRA, AND WORLD GEOGRAPHY TEACHING SCHEDULE

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
ENG A 18.3 / ALG B 21.3 / GEO C 20.3	1 ENGLISH 14-1	ENG Z 18.3 / ALG X 21.3 / GEO Y 20.3	1 SUBJECT ____ ROOM ____	1 ALGEBRA 14-1
B C A		Y Z X		
1 X Y Z / STUDY		1 A B C / STUDY		
2 C A B / LIBRARY	2 ALGEBRA 14-1	2 X Y Z / LIBRARY	2 SUBJECT ____ ROOM ____	2 GEOGRAPHY 14-1
X Y Z		C A B		
A B C / STUDY		X Y Z / STUDY		
3 Y Z X / LIBRARY	3 GEOGRAPHY 14-1	3 B C A / LIBRARY	3 SUBJECT ____ ROOM ____	3 ENGLISH 14-1
Z X Y		A B C		
4 ENGLISH 14-1 / ALGEBRA 14-1 / GEOGRAPHY 14-1	4 LUNCH	4 GEOGRAPHY 14-1 / ENGLISH 14-1 / ALGEBRA 14-1	4 STUDY HALL 14-1	4 LUNCH
5 LUNCH	5 STUDY HALL 14-1	5 LUNCH	5 LUNCH	5 STUDY HALL 14-1

TABLE II

COMPARATIVE PERFORMANCE OF NINTH GRADE PUPILS (4 PERIOD BLOCK TEAM CLASS VS. REGULAR CLASS) ON ETS COOPERATIVE ENGLISH EXAM FORM 2B (GROUPS MATCHED ACCORDING TO SEX, AGE, CTMM VERBAL AND ETS ENGLISH EXAM FORM 2A)

	CTMM VB	PRE-TEST (2A)	POST TEST (2B)		CTMM VB	PRE-TEST (2A)	POST TEST (2B)
EB 1	133	158	161	CB 1	133	161	165
EG 2	125	154	156	CG 2	126	154	157
EG 3	124	156	157	CG 3	122	158	162
EB 4	123	157	162	CB 4	124	153	149
EB 5	123	155	161	CB 5	121	148	149
EG 6	121	149	150	CG 6	121	155	159
EG 7	119	156	164	CG 7	117	155	155
EB 8	118	145	152	CB 8	118	142	148
EG 9	117	150	157	CG 9	117	144	146
EG 10	116	161	169	CG 10	117	160	166
EG 11	115	160	160	CG 11	116	161	163
EG 12	115	151	156	CG 12	115	150	151
EG 13	115	145	153	CG 13	115	147	153
EB 14	114	154	152	CB 14	116	157	152
EB 15	114	148	151	CB 15	113	142	144
EB 16	113	151	153	CB 16	114	149	151
EG 17	113	156	155	CG 17	113	156	162
EB 18	113	151	158	CB 18	113	143	146
EG 19	113	150	154	CG 19	111	146	154
EB 20	112	146	152	CB 20	112	146	151
EG 21	110	153	152	CG 21	111	155	159
EG 22	110	152	155	CG 22	107	149	146
EB 23	108	144	151	CB 23	109	146	149
EB 24	108	151	153	CG 24	107	147	154
EB 25	107	139	144	CB 25	109	139	150
EB 26	107	145	151	CB 26	108	146	148
EG 27	107	149	148	CG 27	107	145	146
EB 28	106	155	155	CB 28	105	151	152
EG 29	106	144	147	CG 29	105	149	147
EB 30	106	143	146	CB 30	103	143	148
EB 31	101	142	147	CB 31	103	143	152
EG 32	99	149	151	CG 32	101	151	158
EB 33	99	140	152	CB 33	101	142	144
EB 34	98	152	158	CB 34	98	141	141
EG 35	95	147	143	CG 35	98	142	144
EG 36	95	141	145	CG 36	97	144	148
EB 37	92	138	133	CB 37	92	139	143
EG 38	90	139	143	CG 38	92	144	145
Total	4200	5676	5807	Total	4207	5643	5757
M=	110.5	149.3	152.8	M=	110.7	148.5	151.5

(N = 38) (N = 38)

E = Experimental
C = Control

B = Boy
G = Girl

TABLE IV
RECAPITULATION–STUDENT QUESTIONNAIRE FOUR-PERIOD BLOCK

All figures are in per cents.

(N = 77)	MORE	SAME	LESS	NO ANS.
1. Was individual attention given to you by teachers?	26	48	26	0
2. Were the teachers normally prepared for lectures and discussions?	56	39	4	1
3. Were you worried or disturbed at being placed under a *team of teachers*, rather than one?	14	42	44	0
4. Did you feel you learned as much here as you would have done in normal classes?	58	23	17	1
5. Were you challenged to work hard?	61	26	13	0
6. Was the atmosphere of the team class a business-like atmosphere?	22	49	26	2
7. Could you hear the lectures and see the blackboard in the larger room?	23	61	14	1
8. Did you feel you showed progress by improving your study habits (as compared with your progress last year)?	43	34	22	1
9. Did you feel at ease when a teacher aide directed the class?	31	47	19	2
10. Did you feel the teachers gave an organized course of instruction?	35	53	10	1
11. Were assignments generally given well in advance?	32	52	13	2
12. Were these assignments clear?	36	51	13	0
13. How effective was the small group instruction (in writing and discussion)?	86	6	4	4
14. Did any teacher have problems in student discipline when he took the class alone (as compared to a normal, smaller class)?	28	56	16	0
15. Did you have a chance to contribute ideas to the class?	30	53	17	0
16. Could you take classroom problems to a teacher for help?	40	44	16	0
17. Did the normal monotony of every day work become less under this team situation?	17	17	66	0
18. Did you have the chance to be creative–that is, write, study, or work on your own ideas?	44	39	17	0
19. Could you take personal (not school work) problems to the teacher?	21	42	31	6
20. Is the large group lecture generally interesting?	51	29	21	0
21. Did you feel that you made progress in learning to think for yourself?	56	38	6	0
22. Did you make many new friends among other pupils in team classes?	73	22	5	0
23. Was the grading policy clearly understood?	30	51	19	0
24. Has your ability to work independently (without supervision) improved in team classes?	49	34	14	2
25. Are you generally satisfied with your team class this year?	51	30	18	1
26. Do you feel this type of class prepared you for college work?	88	7	4	0

[1] Unfortunately ETS norms are not available to indicate a year's growth for the average ninth grade high school pupil (spring of eighth to spring of ninth grade). However, from figures available for tenth, eleventh and twelfth graders, this growth has been approximated at 3.00. Pupils being evaluated in this study averaged 110 on the verbal section of the CTMM; i.e., they could be considered average or just slightly above average high school pupils.

[2] In order to be significant at the .05 level, the "t" ratio for 38 matched pairs would have to be 2.042.

[3] Through planned scheduling, the four-period block and control classes will be comparable groups for the 1963-64 term. It will therefore be possible for this year's evaluation to use group comparisons.

[4] Even if the teacher variable is controlled, a problem still remains the difference in the same teacher's effectiveness period six, for example, as compared to period one.

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